



Spacelab Science

Record-setting mission records cache of life, materials science data

The STS-78 mission is one historians and scientists will not soon forget. Commander Tom Henricks, Pilot Kevin Kregel, Mission Specialists Susan Helms, Rick Linnehan and Chuck Brady and Payload Specialists Jean-Jacques Favier and Bob Thirsk returned to Earth on July 7 with a record 16 day, 21 hour and 48 minute flight and enough science data on the 41 principal investigations to keep scientists busy evaluating the results of the data. Through it all, the crew captured photos to share. From top to bottom, left to right:

- 1) Favier prepares a sample for the Advanced Gradient Heating Facility while wearing instruments that measure upper body movement. Rick Linnehan, right, tests his muscle response with the Handgrip Dynamometer.
- 2) Thirsk, representing the Canadian Space Agency, performs a test on his arm using the Torque Velocity Dynamometer. Thirsk was measuring changes in muscle forces of the biceps and triceps. The TVD hardware also is used to measure leg muscle forces and velocity at the ankle and elbow joints.
- 3) Henricks checks cables on a computer underneath the floor of the Spacelab. The crew performed several in-flight maintenance tasks that helped keep all of the mission's science instruments working well.
- 4) Five NASA astronauts and two international payload specialists take a break from a shuttle duration record-breaker flight to pose for the traditional in-flight crew portrait. Beginning at bottom center and moving clockwise are Kregel, Brady, Linnehan, Henricks, Helms, Favier and Thirsk.
- 5) On the mid-deck, Brady talks to students on Earth via amateur radio. Some of the crew members devoted off-duty time to continue a

long-standing shuttle tradition of communicating with students and other "hams" between their shifts of assigned duty.

6) Linnehan works out in the Life and Microgravity Spacelab module. With an almost 17-day mission away from Earth's gravity, crew members maintained an exercise regimen above and beyond their LMS-1 duty assignments.

7) Favier, left, representing the French Space Agency, and Kregel perform some in-flight maintenance on the Bubble Drop Particle Unit. The technique was performed initially on the ground at the Marshall Space Flight Center by alternate Payload Specialist Pedro Duque of the European Space Agency with the procedure being recorded on video and uplinked to the crew of *Columbia* to aid in the repair.

8) Favier holds up a test container to a Spacelab camera. The test involves the Bubble Drop Particle Unit which Favier is showing to ground controllers at the Marshall Space Flight Center in order to check the condition of the unit prior to heating in the BDPU facility. The test container holds experimental fluid and allows experiment observation through optical windows. BDPU contains three internal cameras that are used to continuously downlink BDPU activity so that behavior of the bubbles can be monitored.

9) Payload Commander Helms takes measurements on Favier during the Voluntary Head Movement experiment. The VHM, part of the Canal and Otolith Interaction Study, is meant to characterize how the coordination of head and eye movement change as a result of space flight. Since most vestibular functions are influenced by gravity, the COIS experiment is meant to measure response differences in microgravity. □

